



**Westlake Villages
Tenth Year (2018)**

Mitigation Monitoring Report

Project No.:
930 AGS

Zentner Planning and Ecology

Oakland

Prepared for:
Shin Kee Wetland and Habitat Restoration Project, LLC

Corps Permit Numbers SPK-200400279 and SPK-200700835,
RWQCB Permit Number WDID#5B39CR00134, and
USFWS Biological Opinions 1-1-06-F-0285 and 1-1-07-F-0308

Date Issued:
October 2018

SUMMARY

This mitigation monitoring report is completed annually as part of conditions set by the United States Army Corps of Engineers (USACE), the Regional Water Quality Control Board (RWQCB), the US Fish and Wildlife Service (USFWS) and the National Oceans and Atmospheric Agency (NOAA) on the Westlake Villages project (Westlake). This report is also completed as part of conditions placed on the restoration work completed at the Shin Kee Wetlands and Restoration Project by the USFWS and NOAA.

The Shin Kee Tract is located adjacent to the White Slough Wildlife Area (WSWA) in San Joaquin County (**Figure 1**). Shin Kee Wetland and Habitat Restoration Project, LLC owns approximately 144 acres of the Shin Kee Tract and has restored wetlands, open water and associated upland habitats on this acreage; this 144-acre area is known as the “Shin Kee Wetlands and Restoration Project” (Shin Kee). Fifty-eight acres of Shin Kee have been designated to provide mitigation for impacts resulting from the Westlake Villages Project; the remaining 86 acres will be utilized to provide mitigation for other projects.

Mitigation monitoring methods are defined in The Westlake Villages Final Wetland Mitigation Plan (WMP) prepared by Zentner and Zentner (now Zentner Planning and Ecology) in June 2008 and approved by the USACE. These were then modified by the Amended Wetland and Habitat Mitigation Program (AWHMP) developed in consultation with agency staff and approved by the USACE and USFWS in 2012. Wetland and upland vegetation cover are assessed annually.

Over the first three years after restoration, the upland and seasonal wetland habitats developed rapidly and met almost all of their performance standards. Shallow subtidal and subtidal habitats did not have performance standards and, accordingly, were judged to be successful as they were representative of these habitat types. Only the tule marsh habitat did not meet its standards as set forth in the AWHMP. The tule marsh habitat, while beginning to meet its plant cover and other performance standards, was not as extensive as required. Therefore, following consultation with agency staff in the summer of 2012, the hydrologic regime was modified and almost 140,000 tule plugs planted in about 35 acres of the site’s lowlands. Over the next two years, the tidal flows and elevations were monitored and the tide gates adjusted until an optimal tidal range was reached to provide a self-sustaining hydrologic regime. The gate positions were then set and have been left without further modification since that time.

2018 is the tenth year of monitoring at Shin Kee. The extent of the tule marsh habitat has remained consistent and above the performance standard of 32 acres for the fourth consecutive year. Other habitat types have already met their five-year performance standards and their results are also presented below.

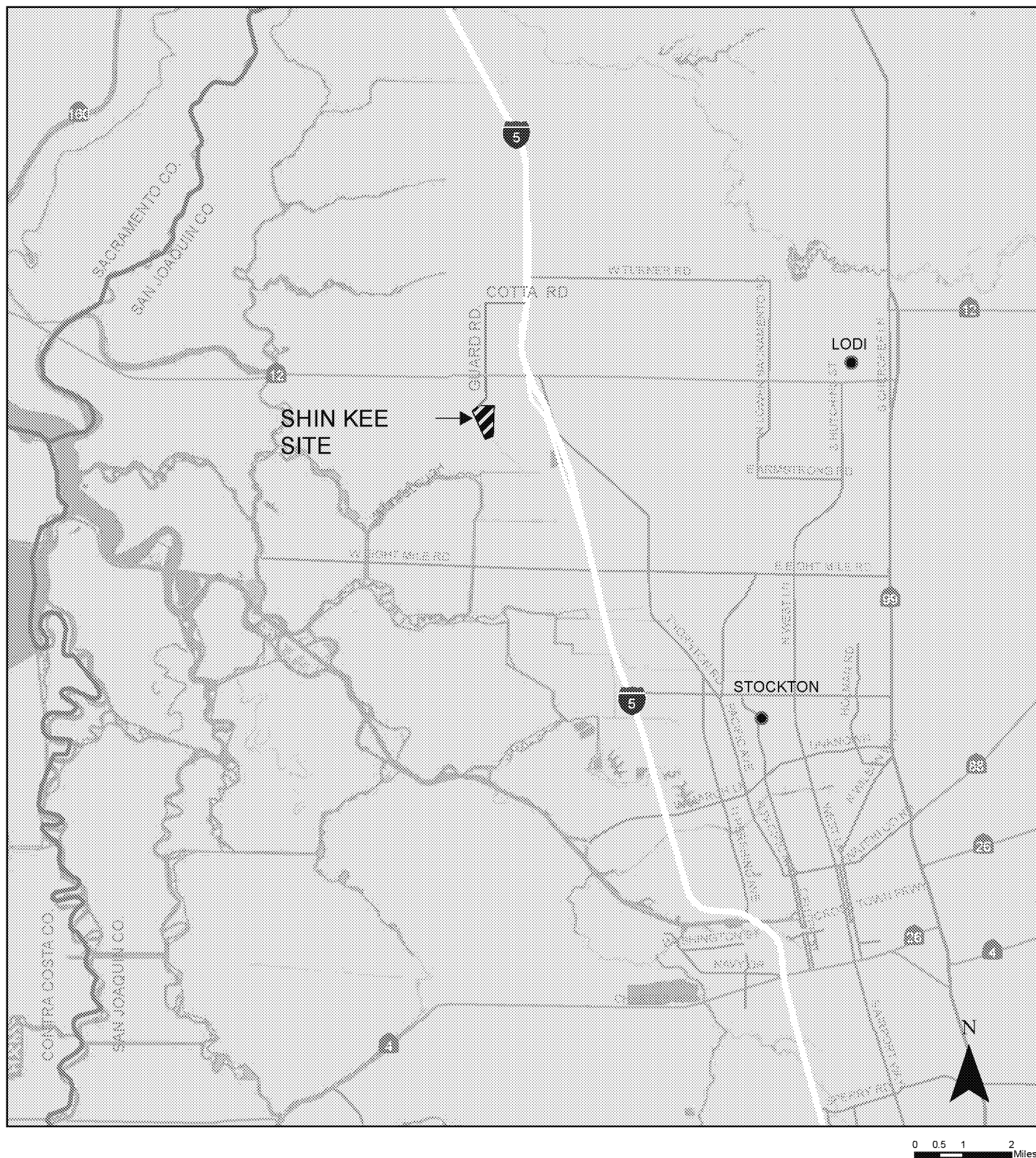


FIGURE 1
LOCATION MAP

SHIN KEE MONITORING REPORT
DATE: 09.08.2018
SOURCE: CaSiL 2010 C:\GIS\monitoring\location.mxd

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I. INTRODUCTION

A. Background

The Westlake Villages project was originally approved in 2008 by the Corps of Engineers (USACE Permit Number SPK-200400279), Regional Water Quality Control Board (RWQCB Permit Number WDID#5B39CR00134), San Joaquin County Council of Governments [SJCOG; Westlake Villages ITMM, which includes the California Department of Fish and Game (CDFG) approval for Westlake), and the US Fish and Wildlife Service (USFWS Biological Opinion 1-1-06-F-0285). As part of these approvals, the 144-acre Shin Kee site was restored to tidal action in 2008 in accordance with the Westlake Villages Final Wetland Mitigation Plan (WMP) prepared by Zentner and Zentner (now Zentner Planning and Ecology) in June 2008¹. The restoration work was carried out in accordance with the above permits and with plans approved for Shin Kee by the USACE (Permit Number SPK-200700835), RWQCB (Permit Number 00122), USFWS (Biological Opinion 1-1-07-F-03080, and CDFG (Consistency Determination 2080-2008-009002).

B. Performance Standards

The progress and final performance standards are shown in Table 1 below.

Table 1
Performance Standards

Element	Progress Standard	Final Standard
Tule Marsh		
Extent	32 acres	32 acres
Absolute Cover	40%	60%
Relative Tall Emergent Cover	50%	50%
Relative Native Cover	70%	80%
Plant Height	2 feet	4 feet
Relative Hydrophyte Cover	80%	90%
Open Water	<40%	<20%

¹ As noted above, 58 acres of the Shin Kee site were designated to provide mitigation for impacts of the Westlake Villages Project while the remainder is reserved for mitigating impacts from other, future projects.

Element	Progress Standard	Final Standard
Seasonal Wetlands		
Absolute Cover	70%	90%
Species Richness	3 species	4 species
Relative Native Cover	45%	65%
Relative Hydrophyte Cover	80%	90%
Uplands		
Absolute Cover	60%	90%
Species Richness	3 species	3 species
Relative Native Cover	25%	30%
Noxious Exotic Weeds	<1% cover beyond current extent	<1% cover beyond current extent

"Noxious exotic weeds" were identified in the AWHMP and are shown below in Table 2.

Table 2
Invasive Plants to be Controlled at Shin Kee

Common Name	Scientific Name	Threat Level	Management Considerations
yellow star thistle	<i>Centaurea solstitialis</i>	High	Present but not abundant; creeping wild rye is outcompeting.
perennial pepperweed	<i>Lepidium latifolium</i>	High	Occasionally present on eastern and western edge but spraying and/or hand removal have limited spread.
Italian and bull thistles	<i>Carduus pycnocephalus</i> , <i>Cirsium vulgare</i> ,	Moderate	Infrequent at Shin Kee.
Himalayan blackberry	<i>Rubus discolor</i>	High	Present on east edge of old levees and not spreading.
tree of heaven	<i>Ailanthus altissimus</i>	High	Not observed at site.
purple loosestrife	<i>Lythrum salicaria</i>	High	Observed in 2009 on east shore; fully eradicated that year.
giant reedgrass	<i>Arundo donax</i>	High	Not observed at site.

C. Monitoring Results 2008-2017

Shin Kee was restored to a mix of habitats including uplands, seasonal wetlands, tule marsh, shallow subtidal and subtidal in 2008.

The monitoring reports from 2008 to 2017 are summarized below by habitat type.

1. Upland Habitat

The upland habitat has performed well since restoration was completed. By year 3, the total vegetation cover had increased to 98% surpassing the reference area related performance standard of 70%. Species richness had nearly doubled relative to the reference site and relative native cover was nearly 64% and significantly greater than the 7% performance standard at the reference areas.

Overall, this zone has been relatively stable since 2011 when it met the 5-year performance standards. As anticipated in the 2011 monitoring report, native cover has continued to slowly expand since meeting the performance standard. Growth of the native creeping wildrye (*Leymus triticoides*) in this zone was already providing excellent cover for wildlife and possibly Giant Garter snake (GGS) due to its height (3 to 4 feet) and dense mat of decomposing stems. Although non-native weeds were numerous, invasive exotics were generally few with minimal cover. Perennial pepperweed (*Lepidium latifolium*) is the most common exotic invasive species in this habitat; there are several small populations of it on the west and east sides of the site. A combination of hand removal and spot-spraying herbicide has prevented the spread of perennial pepperweed and this work is beginning to reduce the presence of the species. There are, however, several large source populations of the species on adjacent lands (the WSWA) which will make permanent eradication difficult.

2. Seasonal Wetland Habitat

The seasonal wetland habitat zone also performed well since restoration was completed. Total vegetation cover improved rapidly in each of the first three years and had risen to 82% by year 3, which was just short of the 90% standard. All other monitored elements had exceeded their final performance standards by year 3.

Like the upland habitat, the seasonal wetland habitat then met its 5-year performance standards and appeared relatively stable with a predominance of native species that provided good cover for wildlife and high tide refugia in the following years. The only invasive exotic noted in this habitat were several individuals of purple loosestrife (*Lythrum salicaria*), which were completely removed by hand and have not been observed on-site in the years since.

3. Tule Marsh Habitat

For the period from 2008 to 2011, the tule marsh habitat occupied a relatively thin and discontinuous fringe between the seasonal marsh and the shallow subtidal habitats. Photo 1 illustrates typical conditions at this time. Where tules were established, the vegetation performed very well. Total vegetation cover increased rapidly each year and reached 100% by year 3. Species richness, number of native species and relative cover of hydrophytes was also high; however, the aerial extent of the tule marsh habitat remained below the performance standards. In consultation with agency staff, the applicant voluntarily developed a plan to adjust the site hydrology and plant tule plugs with the goal of expanding the tule marsh habitat.



Photo 1: Looking southeast across the site from the levee edge. May 2011.



Photo 2: Looking south across the Shin Kee site from above the northern edge of the site. June 2018.

Subsequent to agency approval of the plan, the tidal hydrology of the site was adjusted and planting of tule plugs was completed. In the following two years, tule marsh habitat expanded rapidly, from a few acres to 33 acres in 2015. Similarly, absolute cover and cover by tall emergents increased rapidly; by 2015 (year 7), the tule marsh habitat met its final performance standards. The growth was the result of the development of a stable hydrologic regime. During the analysis period noted above, the tidal range and flows at both Shin Kee and the Coldani Marsh were analyzed. The Coldani Marsh has a very limited tidal range and also has a mean water surface elevation with near-optimal conditions for tule marsh and GGS. The tide gates at Shin Kee were set to mimic the Coldani conditions and then gradually refined over the 2013 to 2015 period to create the tidal range and average elevations found at Coldani. Those conditions were met in 2015 and the tide gates have been kept at those positions since then. This has resulted in steady-state, self-maintaining conditions at Shin Kee.

II. TENTH YEAR MONITORING RESULTS

A. Methods

Vegetation monitoring was conducted following the protocols approved in the WMP using permanent 10-foot by 10-foot plots within the vegetated areas; additional detail on monitoring protocols can be found in the WMP. **Figure 2** shows the monitoring plots.

B. Results

Results from the vegetation surveys are described below; Appendix A contains detailed vegetation sampling results by plot.

1. Upland Habitat

The upland habitat occupies approximately 28 acres and occurs in the zone above the seasonal wetlands and around the upper perimeter of Shin Kee. The upland habitat met all of their performance standards in year 3 and have continued to meet them through year 10 as shown in Table 3.

Table 3
Upland Vegetation Monitoring Results

Monitored Element	Performance Standard	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
Absolute Cover	90%	29%	61%	98%	92%	99%	90%	99%	99%	99%	99%
Species Richness	3	10	10.1	5.8	6.0	7.8	3	5	5	3	3
Relative Native Cover	30%	22%	53%	64%	55%	68%	30%	88%	82%	85%	81%
Noxious Exotics Cover	<1% beyond current	N/A	N/A	N/A	<1% beyond current	<1% beyond current	<1% beyond current	<1% beyond current	<1% beyond current	<1% beyond current	<1% beyond current

Absolute cover remains very high at 99% as it has been for the past four years. Species richness is at the performance standard of 3 for the second consecutive year. Creeping wild rye is the dominant plant in this zone which is characterized by slow stable expansion and dense cover. Dense cover by this species allows it to out compete other species, which creates dense, single-species plots and results in low species richness but high native cover and probably replicates the pre-Columbian landscape for this area.

Relative native cover remains very high at 81%. This is a small (4%) decline, from last year. This level of fluctuation is natural from year to year and does not indicate an overall decline in native cover. We anticipate that native cover will remain around 80% in the coming years. Creeping wild rye continues to be the dominant plant in this zone and it provides good cover for GGS and other wildlife.



FIGURE 2
VEGETATION
MONITORING

REVISIONS	BY

SHIN KEE WETLANDS & HABITAT
RESTORATION PROJECT
2018 MONITORING REPORT
SAN JOAQUIN COUNTY, CALIFORNIA



0 150' 300'

SCALE: 1" = 300'

SOURCE: GOOGLE EARTH 2011

PROJECT NO. AGS 930

FILE: C: 930\shinkee mitsite\
monitoring\ 7yr\monitoring
plots .dwg

DATE: 11.19.2018

LEGEND

1

VEGETATION PLOTS

PROPERTY BOUNDARY



Photo 3: Upland habitat on east side of Shin Kee facing north. Tule marsh is shown on the left side of the photo and the grey-green grass in the center of the photo is native creeping wild rye. June 2018.

Noxious exotic cover first began to be monitored in year 4 as a result of the AWHMP. Since monitoring began, the total cover by noxious exotics has remained below 1%. The CDFW WSWA to the east is a source of numerous exotics and continued surveillance for species such as harding grass (*Phalaris aquatic*) and perennial pepperweed (*lepidium latifolium*) is necessary. Both of these species have been observed within the upland habitat, though current management has controlled their spread and both species are beginning to decrease in abundance within the site.

As shown in the monitoring results (Table 3), the vegetation has been relatively stable over the past six years. This stability is characteristic of established perennial grasses and grass-type plants. The performance of the upland habitat is likely to continue into the future.

2. Seasonal Wetland Habitat

The seasonal wetland habitat occupies about 17 acres, generally below the upland habitat and above the tule marsh habitat. The seasonal wetland habitat met or exceeded all of the required performance standards after year 3. Two years ago after several years of drought conditions,

the wetlands failed to meet the performance standards for relative native cover and relative hydrophyte cover. However, since the end of drought conditions the wetlands have recovered and once again meet all of the performance standards.

Table 4
Seasonal Wetland Vegetation Monitoring Results

Monitored Element	Performance Standard	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year
Absolute Cover	70%	9%	67%	81%	98%	99%	90%	97%	95%	86%	98%
Species Richness	3	7	8.1	7.8	9.0	6.9	4	8	7	5	7
Relative Native Cover	65%	54%	75%	77%	79%	85%	65%	65%	51%	87%	76%
Relative Hydrophyte Cover	90%	100%	99%	99%	95%	99%	90%	83%	60%	97%	85%

Absolute cover continues to meet the performance standard and has increased from 86% last year to 98% this year. Species richness has also increased since last year and is now at 7; this is also above the performance standard. Invasive exotic species remains absent from the seasonal wetland habitat.

Relative native cover remains above the performance standard at 76%; it has however decreased slightly from last year when it was at 87%. Relative hydrophyte cover is above the performance standard at 85% though it has also decreased slightly from last year. Neither of these declines indicate an overall decline in the seasonal wetland habitat. These fluctuations are natural and are highly influenced by a number of site conditions including the amount of rainfall during the monitoring year. For example two years ago the site received an above average amount of rainfall and thus had very high relative hydrophyte cover. This year the site had less rainfall than the previous year and as a result relative hydrophyte cover declined. This level of variation is likely to continue into the future.



Photo 4: Seasonal wetland habitat at Shin Kee. Tall vegetation on left of photo is predominately native hydrophyte Baltic rush and the trees in the background are native Fremont cottonwood trees. October 2018.

3. Tule Marsh Habitat

The tule marsh habitat, which occupies over 33 acres, is generally located in the central lowlands of the site. The central lowlands are a broad flat terrace above the subtidal areas and below the uplands and seasonal wetlands. The vegetation of this area is dominated by tules (*Scirpus americanus*) with primrose (*Ludwigia peploides* and *Ludwigia hexapetala*) interspersed. Cattail (*Typha spp*), common rush (*Juncus effusus*) and tall-flat sedge (*Cyperus eragrostis*) also make up a smaller component of the marsh, primarily in the shallower zones along the marsh fringe.

From 2008 to 2016 tule marsh habitat was monitored with separately established tule vegetation plots and sample aerial photos. However, as discussed in the previous year's monitoring report, because the tule marsh habitat has met or exceeded all of its performance standards since year 7 (2015) and has had stable and consistent growth, tule monitoring will be conducted via aerial photography and with visual inspections of the established sample plots.

Representative aerial photographs were used to evaluate overall tule coverage, density, and growth as compared to the previous year's results (see photos 5 and 6). Visual inspections were used to determine predominant species within the marsh and collaborate the conclusions made based on the aerial photographs. Monitoring data is summarized in Table 5 below.